some cases the backgrounds had been omitted entirely, as in the figure of the sawfish (p. 435), the chimera (p. 431), and others. It is a question, too, whether the painting-in of other backgrounds in photographs is legitimate in a book of this nature, and whether it is not apt to be misleading to beginners when no explanation is given. One might imagine, for example, that the puma (p. 20) is a docile beast which poses calmly in its mountain home in order to be photographed; see also the polar bear (p. 36), the flamingo (p. 266), etc. The "landscape charts" used to illustrate relationships and habitat seem rather strained and overdrawn, while these and the text are somewhat misleading in constantly referring to animals as "higher" and "lower," tending to give the student an idea that the vertebrate affinities lie in a direct chain, rather than forming a complicated, branching system.

Mistakes of fact are by no means lacking, especially points in the anatomy of the exotic species; and the classification is throughout largely artificial and based upon superficial resemblances and analogies.

In the introduction the author makes some very conservative remarks regarding the tendency to humanize animals and to ascribe to them a higher order of intelligence than they possess; but unfortunately he has in many cases been unable to avoid at least the semblance of the fault himself, as when he says (p. 93): "*The most humorous of all rat-like animals* is the Trading Rat, ... which delights in playing practical jokes upon its human neighbors." He is perhaps inclined at times, too, to make over-positive statements which cannot be taken quite literally.

This book will probably not become generally used as an intermediate text-book; but it will be found a partial substitute for those who have no opportunity to visit a good zoölogical park, and will certainly add greatly to the pleasure of those who do have that privilege. It is an excellent work for home reading and reference.

L. J. C.

Notes. — The zoögeographical relations of South America recently have been discussed by Dr. G. Pfeffer (*Zoöl. Jahrb.*, Suppl. 8, 1905, pp. 407–442), with reference to the reptiles, amphibians, and fishes, especially as to the question of the former land connections of this continent with Africa and with Australia. It is apparently the desire of the author to demonstrate that there is no evidence whatever for the assumption of such connections, and, consequently, the paper

chiefly discusses those cases, which are not in favor of the former land connection between these continents, that is to say, which do not directly bear upon this question, while other cases, which might possibly furnish additional evidence are dismissed shortly.

The general trend of Pfeffer's argumentation is as follows. There are a number of instances, where discontinuous distribution in all or some of the southern continents is evidently a remnant of a former universal or subuniversal distribution, which is clearly shown by the presence of fossil remains of the several groups of animals in other parts of the world. On the other hand, there are similar cases, in which fossil remains are not known at all, or are not known from the northern continents. Here, Pfeffer claims, we have the right to assume, that these groups nevertheless once existed on the northern hemisphere, and they also once were subuniversal in their distribution.

Here we are again confronted with a fallacious generalization of correct observations, a way of drawing conclusions that has so often given origin to incorrect general theories. Of course, if some groups of animals, that are now more or less restricted, were once universal in their distribution, it is evident, that very likely some others were, of which no direct evidence of universality has been found. But the conclusion, that all such cases are to be explained by this assumption, is, to say the least, a little rash. Moreover, we do not intend to find a theory that might under certain assumptions explain the present facts, but we ought to try to find the correct explanation, and thus no way of ascertaining the latter should be neglected, and doubtful cases should not be dismissed shortly, but subjected to a careful and thorough study.

In the present paper, Pfeffer only talks of paleontological evidence, and almost entirely neglects the morphological (systematic) relations of the different forms. It is sufficient for him, if certain forms are found in Africa and South America, to point out that they might have been once present also in North America and Eurasia, and that thus a connection may be established (over Bering Sea). If similar forms are also found in India, this assumption seems to him beyond question. He does not pay the slightest attention to the mutual relations of these forms.

Now it is a fact, that the former land connections between tropical South America and Africa, and between southern South Africa and Australia have been supported chiefly by studies of the degree of the relation of their faunas. We know cases where members of the

fauna of South America find allied forms in many parts of the world, but where the most closely allied forms are found in Australia; in other cases, the nearest relations are found in West Africa. For such cases the theory of former subuniversal distribution is entirely insufficient, and only leads to the further question, why it is, that from a former universal distribution, the most closely allied remnants are found in the most remote parts? For we must always bear in mind, that, if we do not admit direct connections between South America and Africa, and South America and Australia, the connection of these parts always goes by way of Bering Sea or Greenland.

Pfeffer himself mentions a number of instances, where the present distribution appears to favor a direct connection of the three southern continents, but he never studies them closely, and is satisfied with the conclusion that they very likely are also remnants of a former subuniversal distribution. The following are the most striking examples: *Chelonia*, family Miolaniidæ; *Lacertilia*, genus Mabuia, family Amphisbænidæ; *Ophidia*, families Typhlopidæ and Glauconiidæ, genus Leptodira; *Batrachia Anura*, families Pipidæ, Cystignathidæ, Hylidæ, and Engystomidæ; *Batrachia Apoda*, family Cœciliidæ; *Teleostei*, families Characinidæ, Symbranchidæ, Serranidæ, Cichlidæ.

I do not say that these groups actually furnish evidence for the supposed former connections of the southern continents; I only want to call attention to them, with a view to having them made the object of careful, detailed, and unprejudiced examination, paying principal attention to the mutual affinities of their representative members in the different parts of the world. Pfeffer has not done this, and thus his treatment of these groups is superficial and unsatisfactory; in some of the above instances, objections to the assumption of former subuniversality of distribution are evident at the first glance.

Thus Pfeffer's final conclusion, that there is no necessity for the assumption of direct land connections between South America and Africa, and South America and Australia, upon zoögeographical grounds, is not properly supported even with reference to those groups which he made his special object of study in the present paper. In the face of the fact that there are other groups not mentioned and studied by Pfeffer, that have furnished positive evidence for these connections, and in which the assumption of former subuniversal distribution is entirely unsatisfactory, rendering the present conditions only more unintelligible, we get the impression that Pfeffer did not take up these studies with an unbiased mind.

One additional objection should be made. Pfeffer repeatedly talks of a pre-Tertiary South America, and of the separation of South America from the rest of the world at the end of the Cretaceous time (p. 411, p. 427, p. 430; "præpanamensisches Pan-America"). This tends to show that his ideas about the geological history of South America are entirely at variance with certain geological facts. We know that there was no South America at all as a continuous mass before the beginning of the Tertiary, and that the first connection of what is now South America with North America falls into the Miocene. For this we do not possess a mere theory, but positive geological facts; it is impossible to deny the existence of Jurassic and Cretaceous marine deposits over large parts of South America, or to neglect the fact of their existence. But if we pay due attention to this, then it is inadmissible to speak of a pre-Tertiary South America, and to talk of a severing-off of South America from the rest of the world at the end of the Cretaceous.

A. E. ORTMANN.

A detailed account of the anatomy of the chiton, *Cryptoplax larvæformis*, has been published by E. Wettstein (*Jena. Zeitschr.*, Bd. 38, p. 473).

N. Maclaren (*Jena. Zeitschr.*, Bd. 38, p. 573) discusses the structure and systematic relations of two trematodes, *Diplectanum æquans* Wagener and *Nemathobothrium molæ* n. sp.

Anatomy and Histology of Dentalium. — The following facts are recorded by M. Boissevain (*Jena. Zeitschr.*, Bd. 38, p. 553) on the anatomy and histology of Dentalium. The whole foot is ciliated and glandular. The intestinal musculature consists of a thin layer of circular fibers with occasional muscle bridges. The subradular organ carries an organ of taste. The communication between the genital glands and the kidney is renewed with each period of sexual activity.

F. A. Bather, in the *Geological Magazine* (dec. 5, vol. 2, p. 161) characterizes *Sympterura minveri*, n. g. et sp., a Devonian Ophiurid from Cornwall. The genus is thus diagnosed: a Lapworthurid with spinulose disc extending to second arm-segment, with oral skeleton of teeth, long jaws, and short mouth-frames (torus not seen), with free arm-segments containing a vertebral ossicle, possibly compound, grooved ventrally and provided on each side with two wings, to the distal of which is attached an adambulacral spiniferous element. The structure of the arm-segments suggests

that the vertebræ may be composed of two successive pairs of ambulacral elements, and reasons are given for suspecting that this may be the case in all the more advanced Ophiurids. The holotype of the species, which is the first echinoderm described from these Cornish slates, is in the British Museum.

In recent numbers of the *Bulletin du Musée Océanographique de Monaco*, E. Chevreux describes two new deep-sea amphipods, *Cyphocaris alicei* and *C. richardi*, from the waters between the Canaries and the Azores. G. O. Sars contributes the first part of a preliminary list of the Calanoids collected during the Prince of Monaco's deep-sea explorations. A list of the Symphyla and Diplopoda of the principality of Monaco is given by H. W. Brölemann.

The migratory movements of certain species of Pierids in the Amazon valley are described by Dr. Gœldi in vol. 4 of *Boletim do Museu Gœldi*. The same journal contains a list of the Brasilian birds described by Spix, Wied, Burmeister, and Pelzeln, and a catalogue of the mammals in the collection of the Para Museum. A number of interesting notes on the mammals are added and well executed plates illustrate several of the species.

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